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As expectations for increased student performance mounts, there are limited sources of assistance for teachers who struggle to bridge the gap between the practices they engage in and students' performance. This is particularly true for kindergarten teachers, who are currently being asked to do more with an increasingly diverse student population and calls for accountability. Given these challenges concerns exist about how satisfied teachers are with their job and whether the early academic achievement of children is being impacted by how they feel. Also of interest is whether children's socioeconomic status and professional development for teachers moderate the hypothesized satisfaction-achievement link.

A nationally representative sample of students was used to investigate these associations in the kindergarten year. Results show that teachers' general job satisfaction is not significantly associated with students' academic achievement. No significant associations were found between teachers' professional development and students' academic achievement. However, children's socioeconomic status was significantly associated with students' academic achievement. Recommendations for future studies are discussed.

TEACHERS' JOB SATISFACTION, THEIR PROFESSIONAL DEVELOPMENT AND THE ACADEMIC ACHIEVEMENT OF LOW-INCOME KINDERGARTNERS

by

Anurika D. Ejimofor

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Approved by

_____
Committee Chair

To Anna

APPROVAL PAGE

This dissertation written by ANURIKA D. EJIMOFOR has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____

Committee Members _____

_____

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_____
Date of Acceptance by Committee

_____10/9/15_____
Date of Final Oral Examination

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CHAPTER I

INTRODUCTION

Cognizant of the universal premium now placed on education, and the demographic and economic changes in the American society, the cost of school failure is greater now than it has ever been. Significant amounts of resources are being invested earlier to promote children's academic achievement and empirical evidence has shown that for young children the transition to formal schooling is a major occurrence, which could mark the onset of a life trajectory characterized by success or failure. This realization has led to an increased focus on the effects of teachers' characteristics on children's early academic achievement.

A teacher's role can succinctly be described as teaching the prescribed curriculum *in a way* that fosters academic gains. The mode of content delivery is critical in attaining this goal, and one teacher characteristic that has emerged as impacting the process is teachers' job satisfaction (Huysman, 2008). According to Huysman (2008) teachers must maintain an acceptable level of job satisfaction if they are to adequately prepare themselves to present information and skills essential for students to advance in academic achievement. In this regard, teachers' professional development has been identified as a mechanism for boosting teachers' satisfaction, especially in the context of increasing accountability demands and changing student demographics.

Teacher effects are important for all children, however, for young children, theory and previous research have in particular, established the significance of the early years as a time for opportunity or risk, when children's cognitive development is most impressionable. This is evident in studies that show that the foundation for future learning is developed in the early years when children develop basic skills and abilities which help shape the architecture of the brain and prepare them for future learning (Lizzio & Wilson, 2013).

Cognitive development is a cumulative process, during which students make incremental gains in the acquisition of skills (Duncan, Dowsett, Claessens, Magnuson, Huston, Klebanov, Feinstein, Engel, Brooks-Gunn, Sexton, Duckworth, & Japel, 2007). Stable optimal increments in academic achievement at the beginning of students' academic career, (as reflected in assessment measures) have been found to be highly correlated with scores on achievement tests throughout their school career. Later in life, there still exists the possibility for cognitive development, however as time goes by, making up for opportunities lost earlier on becomes more difficult and costly (Lizzio & Wilson, 2013). This is especially true for children in low-income families who face additional barriers to successful academic advancement.

Children represent 24 percent of the population in the United States, but makeup 34 percent of people in poverty (National Center for Children in Poverty [NCCP], 2013). Among all children, 45 percent live in low-income families, and approximately one in every five (22 percent) live in poor families. Among children under the age of six, 49

percent live in low- income families, and 25 percent live in poor families (NCCP, 2013). Being a child in a low-income or poor family comes with consequences, especially for young children. This is because it is not solely poverty that matters for children's outcomes, but also the early *timing* of child poverty. Poverty early in life can be especially detrimental to children's academic attainment. Blair (2010) explained that the exposure to early stress associated with inadequate family resources, increases the presence of classes of stress hormones and neurotransmitters, which alter the development of the neural pathways associated with executive function. This explanation has been supported by electrophysiological evidence, which showed that children from low-SES families have altered prefrontal functioning compared to children from higher-SES backgrounds (Kishiyama, Boyce, Jimenez, Perry, & Knight, 2009). Socioeconomically disadvantaged children are also less likely to experience cognitively rich homes and neighborhood environments (Ready, 2010).

In addition to establishing that socioeconomically disadvantaged children enter school with fewer academic skills, researchers have shown that following school entry, children's socioeconomic status moderates the associations between teachers' characteristics and students achievement (Quay & Jarret, 1986). This makes it necessary to consider children's socioeconomic status when investigating their academic achievement following school entry.

In schools the pressure to increase academic achievement is increasing, and teachers in the early grades are no longer left out. Consequently, there has been

significant focus on understanding teachers' effects on students' academic gains, with many of such studies focusing on teachers' content and skill acquisition, which are without doubt important, but do not fully explain the impact of teachers' on children's academic achievement. This study seeks to add to the literature by exploring a teacher characteristic which has till date received sparse attention in the early education literature— job satisfaction, and two factors that may exacerbate or diminish its impact on students' achievement, as they begin formal schooling—students' socioeconomic status and teachers' professional development.

CHAPTER II

LITERATURE REVIEW

The Bioecological Theory of Development

Formal education is an important part of the American society. It is the institution through which generations have been imparted with the skills and values they need to be productive citizens. In recent years there has been a rise in the level of discontent with children's academic performance. Parents, political, and educational critics amongst others, complain that schools are not adequately educating children, and teachers get a significant part of the blame. In order to understand why educational goals are not being met, it is helpful to examine and strive to understand the interactions between teachers and students in classrooms and school contexts as early as possible. Such an examination requires the utility of a framework that guides the proposed exploration and explains observed phenomena. In this regard Bronfenbrenner's explication of proximal processes as embedded in the Person-Process-Context-Time model (PPCT for short) of the bioecological theory presents strong utility.

The bioecological theory articulated by Bronfenbrenner and colleagues (Bronfenbrenner & Morris, 2006) provides a viable framework that affords an understanding of investigations into the many concurrent factors and levels of influence that can support or hinder children's optimal academic development. These factors and

their levels of influence range from those most proximal in which the child is directly and routinely engaged with, like with parents and teachers in their classrooms, to those that exercise more indirect influences such as school board meetings, policies and staff programs.

Propositions

Proximal process. The bioecological theory of human development consists of four components—person, process, context and time, which together constitute a model for understanding and designing research to study the course of early childhood development across domains. *Process*, specifically called proximal processes, constitutes the core of the model, and has been specified as the key factor in development through which human potential is actualized (Bronfenbrenner, 1994). It constitutes the dynamic interactions between the child and other people (such as parents and teachers), and between the child and his or her ecology (the microsystem, mesosystem, exosystem, macrosystem and chronosystem). The strength of proximal processes to impact development has been shown to vary significantly as a function of the characteristics of the developing *person* (child), the immediate and more remote environmental *contexts* (e.g., home and/or classroom and school), and the *time* periods (e.g., age of child, start of school, and educational policies being adopted) in which the proximal processes occur (Bronfenbrenner & Morris, 2006). Investigating the proximal processes that lead to academic success in school, Chun and Dickson (2011) identified responsive teaching as a significant predictor of academic outcomes. Specifically, responsive interactions and

experiences where teachers helped students develop a sense of self-efficacy and school belonging were associated with increased academic achievement. Findings have also noted that children's engagement in the classroom, which is dependent on proximal processes has been shown to predict academic growth and learning (Downer, Rimm-Kaufman, & Pianta, 2007).

Person. The impact of proximal processes upon development has been shown to vary significantly as a function of the characteristics of the *persons* involved, the environmental *contexts*, and the *time* periods when the proximal processes occur (Bronfenbrenner & Morris, 2006). However, Bronfenbrenner identified *person* characteristics as most influential in shaping the course of a child's development, because of its impact on both the direction and power of proximal processes (Bronfenbrenner & Morris, 2006). According to Bronfenbrenner, three types of person characteristic exist, which characterize parents, teachers, and others who participate in the life of the developing child on a regular basis over extended periods of time (Bronfenbrenner & Morris, 2006). They are demand, resource, and force characteristics. Demand characteristics are those that act as an immediate stimulus to another person (for example, gender, age, physical appearance and skin color or race). These types of characteristics can influence initial interactions because of the expectations formed immediately by other persons (Tudge, Mokrova, Hatfield, & Karnik, 2009). Resource characteristics on the other hand are not immediately apparent, and are often induced with varying degrees of accuracy from the demand characteristics that are seen (Tudge, et al., 2009). Examples

include ability, experience, knowledge and skill, all of which are required for the effective functioning of proximal processes (Bronfenbrenner & Morris, 2006). Finally, and particularly pertinent to the present study are force characteristics, also known as dispositions. These characteristics have to do with differences in satisfaction, motivation, persistence, and the like, which can set proximal processes in motion in a particular developmental domain and continue to sustain their operation (Tudge, et al., 2009). According to Bronfenbrenner, two individuals may have similar resource characteristics, but their experience of proximal processes and the developmental trajectories they foster could be quite different if one possesses dispositions that help them persist in tasks, and the other lacks such dispositions and does not persist in tasks (Tudge et al., 2009).

Context. For young children, the impact of contexts such as the classroom in which they spend a good deal of time engaging in activities and interactions are moderated by proximal processes. Contexts in which children experience little warmth and poor interactions from adults in their lives can be detrimental to their development (Bronfenbrenner & Morris, 2006). For example, Arana, Castaneda-Sound, Blanchard, and Aguilar (2011) found that students who persisted in their academic pursuits on many occasions credited their success to teachers who encouraged and supported their utilization of available resources. There are also important contexts outside of children's immediate environment, which indirectly impact the proximal processes associated with their development. Fantuzzo, Perlman, Sprouli and Minni (2012), found that increasing demands on early grades teachers raised job stress, which is negatively associated with

job satisfaction. These demands subsequently impacted proximal processes in the classroom, and led to a negative relationship between job stress and teaching practices (Fantuzzo et al., 2012). High levels of reported stress were also related to a decrease in the amount of time dedicated to teaching the cognitive domains of literacy and mathematics, and actively engaging parents.

Time. Time in the PPCT model is recognized as impacting proximal processes at three levels. First is micro-time, which refers to events that are occurring during the course of some specific activity or interaction. Second is meso-time, which is the extent to which activities and interactions occur with some consistency in the child's environment, such as days and weeks (Tudge et al., 2009). To be successful in producing optimal academic development, proximal processes need to be reciprocal, progressively complex, sensitive to children's needs and occur regularly over an extended period of time. Third is macro-time, which focuses on the changing expectations and events in the larger society. Examples include the No Child Left Behind (NCLB) legislation, increases in the proportion of poor and diverse students, and increased accountability demands on early educators.

The bioecological model of teaching and learning

An application of the bioecological model to teaching and learning requires a focus on the proximal processes that occur between teachers and students, and the contexts in which they occur. This establishes the basis for understanding students within their ecology as active participants in their learning, where learning occurs through

interactions. Additionally, the impact of the interactions upon students' abilities is moderated by their own unique life circumstance. For example, their socioeconomic status, which has been shown to moderate the learning experiences for different students (Ready & Wright, 2011). It is also important to recognize that the feelings of teachers influence the learning process and students' outcomes (Kunter, Baumert, Voss, Klusmann, Richter, & Hachfeld, 2013). Therefore a holistic examination of students' learning outcomes will not only include the content and/or context of learning, but will also consider the context experienced by students, teachers and the way in which content is delivered. The latter consideration, i.e., the way in which content is delivered suggests the importance of professional development opportunities, which have the potential to impact teachers' experience, their satisfaction, the delivery of content and student achievement.

Consequently, the present study employs the bioecological model to investigate whether teachers' job satisfaction, a *person force characteristic,* impacts children's academic outcomes in the kindergarten classroom *context,* a main setting for *proximal processes* for kindergartners, at a *time* when they are beginning their formal schooling experience. Also investigated is whether the impact of teachers' job satisfaction on students' academic outcomes varies by student's socioeconomic status, a *person resource characteristic* and teachers' professional development, a school *context* factor.

Teacher Characteristics

Empirical evidence has shown that for young children the transition to formal schooling is a major occurrence, which could impact their future outcomes (Pianta & Walsh, 1996; Belsky & MacKinnon, 1994). This realization highlights the importance of teacher characteristics on children's early academic achievement

Teacher characteristics can be described as those traits and or attributes that have the potential to impact teachers' effectiveness. In recent years there has been an increase in studies investigating these traits and or attributes, and their impact on children's academic gains (Kennedy, Ahn, & Choi, 2008; Zumwalt & Craig, 2005). The growing evidence shows that teacher characteristics have a substantial effect on students' academic achievement (Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004). In comparison to measures of school quality, such as class size and schools' resources, studies have shown that the impact of teacher characteristics on students' academic achievement can be substantial (Odden, Borman, & Fermanich, 2004), ranking in importance after only individual and family background characteristics (Goldhaber & Brewer, 1997) . Nye, Konstantoppoulos and Hedges's (2004) review of the literature, revealed that teachers' characteristics were responsible for 7 to 21 percent of the variance in students' academic achievement. Teacher effects on students' early achievement have also been shown to persist into later grades. For example results from a randomized study which investigated the effects of teachers' characteristics in the early grades found that overall teachers' effects in students' math and reading achievement persisted from kindergarten through

third grade (Konstantopoulos, 2011). A key pathway through which teachers' characteristics impact students' achievement is by influencing teacher-child interactions, including the quality of instruction and or mode of delivery (Ready & Wright, 2011).

The focus of several teacher characteristics studies have been limited to the general cognitive abilities of teachers such as, teachers' degree level, experience and certification (e.g., Wayne & Youngs, 2003; Yeh, 2009; Zumwalt & Craig, 2005, Hanushek, 1986) which have been associated with teacher quality, but for which findings remain mixed (Phillips, 2010). It is also important to note that these teacher characteristics—education and experience have been credited with only a small amount of teachers' effects (Rivkin, Hanushek, & Kain, 2005; Nye, Kostantopoulos, & Hedges, 2004), leaving unaccounted a significant amount of teachers' effects. On the other hand relatively limited attention has been paid to the effects of less observable teachers' characteristics, which pertain to teachers dispositions (Goldhaber & Brewer, 1997), despite evidence that they are significantly involved in processes that impact student outcomes (Goldhaber & Brewer, 1997). Consequently, this study investigates one such characteristic—teachers' job satisfaction.

Teachers' Job Satisfaction

Teachers' job satisfaction has been understudied, despite its direct links to teacher mobility and attrition which can be detrimental to students' achievement gains (Veldman, Tartwijk, Brekelmans, & Wubbels, 2013). Teacher satisfaction could also potentially affect the mental and physical health of the teacher, which could lead to absenteeism

(Bingham, 1996). Even when dissatisfied teachers do not leave their jobs students' academic achievement suffers. Amit (1994) found that teachers with low levels of job satisfaction were less effective teachers, compared to their colleagues with high levels of job satisfaction, and concluded that more satisfied teachers were more likely to be involved in their job.

Job satisfaction has been defined in several ways (Mafini & Pooe, 2013). Price (2001) defines it as the affective orientation that an employee has towards his or her work. Sempane, Rieger and Roodt (2002) note that it may be recognized as an individual's perception and evaluation of the overall work environment. Islam and Siengthai (2009) describe it as the "positive or negative" emotional state resulting from the appraisal of one's job or job experiences. It has also been defined as "an affective response to one's job as a whole or to particular facets of it" (Cooley & Yovanoff, 1996). A common aspect that underlies these definitions is that job satisfaction is concerned with what people feel about their work (Mafini & Pooe, 2013).

Inquiry about the job satisfaction of kindergarten teachers is especially important, in view of the evolving student demographic challenges and the changing roles kindergarten teachers are having to manage. There exists sparse research carried out in the field of education to understand the construct of job satisfaction and its consequence for impacting students' outcomes. However, results show that job satisfaction can promote productivity and efficiency (Schneider, Hanges, Smith, & Salvaggio, 2003). A positive relationship has also been found between job satisfaction and factors such as

motivation, involvement, performance and productivity (Judge, Thoresen, Bono, & Patton, 2001; Harter, Schmidt, & Hayes, 2002)

Teachers' job satisfaction has been found to impact student achievement, through the type of interactions teachers engage in with students (Katzell &Thompson, 1990); and the quality of their instruction (Kunter, Tsai, Klusmann, Brunner, Kraus, & Baumert, 2008). These findings are consistent with the propositions of the bioecological theory of human development, in which Bronfenbrenner and Morris (2006) identified the *person* characteristic as most influential in shaping a child's development, by affecting both the direction and power of proximal processes. One pathway through which job satisfaction may lead to student outcomes is the degree to which interactions with students are infused with motivation and enthusiasm. Katzell and Thompson (1990) observed that individuals who are more satisfied with their jobs are more highly motivated to remain in and perform tasks enthusiastically. Kunter et al. (2013) showed that teachers' motivation which is predicted by teachers' job satisfaction is an important precursor for teachers' provision of learning supports. Higher teaching enthusiasm, which is dependent on teachers' satisfaction has been found to predict three aspects of instruction quality which underlie student achievement— the degree of cognitive challenge and activation offered to students, the degree of learning support provided through individual monitoring of the learning process, and efficient classroom management (Kunter, Tsai, Klusmann, Brunner, Krauss, & Baumert, 2008).

It is important to recognize that for kindergarten teachers whose role and challenges have evolved in recent years, concerns exist about their job satisfaction. Kindergarten teachers have been asked to do more with the increased calls for accountability (Goldstein, 2008). They also face additional challenges working with an increasing number of poor and culturally diverse group of students (Sullivan, Hegde, Ballard, & Ticknor, 2015). Many kindergarten teachers were not initially hired to do this "kind" of work nor have they been adequately prepared to do so by their training (Elmore, 2002). Given these conditions, some teachers consider the demands for optimal student achievement unreasonable and experience diminished satisfaction at their jobs (Mitchelle, Oritz, & Mitcelle, 1987; Rosenholtz, 1991) as well as severe performance problems (Elmore, 2002).

Professional Development

The school setting is an important context outside of children's immediate classroom environment, which indirectly impacts the proximal processes associated with their development (Bronfenbrenner & Morris, 2006). In particular, the degree to which teachers experience professional development in their schools have been found to impact children's academic achievement, by impacting proximal processes in the classroom (Blase & Blase, 2000). However, Elmore (2002) observed that at the same time the expectations for students' performance are increasing, there exists few processes for teachers to learn and adapt practices accordingly.

Existing evidence shows that teachers have difficulty getting the professional support they need to effectively manage students' academic development. A survey by

the National Center for Education Statistics (NCES) (2004) found that up to 38 percent of public school teachers cite dissatisfaction with support from administrators as the reason for moving to a new school—significantly more than the 19 percent who reported changing schools to obtain a better salary or benefits. About 51 percent of public school teachers who left teaching in 2012-2013 reported that the manageability of their workload was better in their current position than in teaching (NCES, 2014).

Professional development refers to activities designed to increase the skill and knowledge of teachers (Fenstermarcher, 1985). It differs from pre-service education by the fact that it occurs after teachers are on the job, during the routine course of their work (Elmore, 2002). Professional development programs are intended to equip teachers with a "toolbox" that will extend their knowledge regarding the subject matter taught, instructional strategies and interpersonal communication skills. In this sense, professional development is considered a key component in improving students' academic achievement (Guskey, 2003; Newmann, King, & Youngs, 2000). Professional development opportunities present avenues for consensus building among teachers and administrators within schools (Sparks & Hirsh, 1997). They can provide opportunities for everyone to work together to develop action plans and identify strategies aimed at meeting the school's overall mission. These may be especially important for schools with high proportions of at-risk students, as such a forum may serve as a platform to raise key practical issues and or challenges about teaching and learning that may never arise through a process of simple consensus building (Elmore, 2002).

Studies also show that professional development have the potential to moderate the association between teacher effects and student achievement (Yoon et al., 2007). For example, Cohen and Hill (2001) found that the strength of the association between teachers' satisfaction and student achievement was impacted by teachers' professional development. Results showed that this association was strengthened as the quality of professional development increased and vice versa. Cohen and Hill (2001), identified the extent to which teachers adapted their practices to programs' recommendations, as the mechanism driving the effects. Similarly, Nir and Bogler (2008) note that professional development provides teachers with a major channel of support that enables them to enhance their professional knowledge and teaching techniques, which are key to boosting student achievement.

Other benefits of professional development have been reported by Blase and Blase (2000). These researchers found that such opportunities not only addressed emergent needs of teachers, but were also found to support collaborative efforts among teachers, encouraged teachers to redesign instructional programs and provided essential resources to support programs—acts that resulted in increased reflective behavior and job satisfaction (Ostroff, 1992).

Socioeconomic Status and Academic Achievement

Efforts aimed at optimizing academic achievement at the onset of formal schooling are important for all children, but they are especially critical for children from low socioeconomic backgrounds who face additional barriers to academic gains

(Goodman, Miller, & West-Olatunji, 2012). Family income, parent education, employment or a combination of these often comprise the socioeconomic status and have been shown to be reliable correlates of children's outcomes (Janus & Duku, 2007). Consistent associations have been found between the family SES of children and their academic achievement throughout childhood (Sirin, 2005; Halle, Forry, Hair, Perper, Wandner, Wesel, & Vick, 2009). Using the Early Childhood Longitudinal Study data, West, Denton and Reaney, (2000) found that children's early reading and math skills differed according to their socioeconomic status in the first year of school. By the spring of the kindergarten year children with fewer SES risk factors, such as low maternal education, home language other than English, utilization of social assistance, and single-parent family status were more likely to have developed better approaches to learning than children with more SES risks. Findings from The NICHD Early Child Care Research Network, (2005) longitudinal studies also indicated that economic disadvantage is strongly associated with lower cognitive outcomes from toddlerhood through third grade, and the mechanism through which this outcome is exhibited has been attributed to the several disadvantages that poor families experience, including economic insecurity and parent's education which impacts the home environment and child rearing quality.

Evidence for the moderating effect of socioeconomic status on students' academic achievement have also been reported in the literature (Ready & Wright, 2011). According to the bioecological theory of human development, the strength of proximal processes to impact a child's development varies significantly as a function of the characteristics of

the developing child (Bronfenbrenner & Morris, 2006). Studies have revealed children's socioeconomic status as an important *resource* characteristic, which varies the impact of proximal processes on children's academic achievement. In general, children's SES has been found to moderate the association between teacher effects and student achievement (Moller, Mickleson, Stearns, Banerjee, & Bottia, 2013). For example, Ready and Wright (2011) reported that the strength of the association between teachers' perceptions of young children's' cognitive abilities and students' achievement varied, depending on students' SES. This association weakened for low SES students, and vice versa. Ready and Wright (2011) highlighted the frequency of learning opportunities teachers provided as the mechanism driving the effects, which increased for high-SES students and decreased for low-SES students.

These studies illustrate that typically SES does not operate in isolation in impacting young children's academic achievement, rather it is the accumulation of risk factors that more appropriately explain observed academic outcomes for children. This premise which embodies an ecological perspective and acknowledges the interaction of factors will be utilized in the current study to better understand children's early academic outcomes.

The Current Study

This study seeks to investigate the impact of teachers' job satisfaction on children's academic achievement at the important start of their schooling career. Also of interest is an examination of whether kindergartners' socioeconomic status and teachers' professional development moderate the expected association.

Research questions and hypotheses

The present study sought to examine whether teachers' job satisfaction, a *person* characteristic, noted for its impact on student achievement (Madden et al., 1976) would show similar effects for students at the start of their formal schooling—kindergarten.

Research question 1: What is the relationship between teachers' job satisfaction and kindergartners' academic achievement?

Previous studies have reported that job satisfaction effects on academic achievement can be attributed to its positive association with instruction quality (e.g., Bingham, 1996; Halderson, Kelley, Keefe, & Berge, 1989). Katzell and Thompson (1990) note further, that teachers' job satisfaction impacts the degree to which teachers' interactions with students are infused with motivation and enthusiasm.

H_0^1: A positive relationship will exist between teachers' job satisfaction and Kindergartner's academic achievement.

Children's SES has been found to moderate the association between teacher effects and student achievement (e.g., Moller, Mickleson, Stearns, Banerjee & Bottia, 2013). Therefore, the present study sought to investigate whether children's socioeconomic status would moderate the expected association between teachers' job satisfaction and kindergartners' academic achievement.

Research question 2: If a relationship exists between teachers' job satisfaction and Kindergartner's academic achievement, is this relationship moderated by kindergartners' socioeconomic status?

Relative to their high SES peers, school and teacher characteristics have a stronger effect on low SES students, who often begin school at a disadvantage. For example, Moller et al. (2013) found that the association between teachers' report on the strength of their professional development communities and student academic achievement varied by students' SES. The strength of the association was stronger for low SES students for whom non-optimal instruction further widened the achievement gap. The current study expects similar associations, i.e., a stronger association between teachers' job satisfaction and academic achievement for low SES students and vice versa.

H_0^2: The impact of teachers' job satisfaction on Kindergartners' academic achievement will be moderated by Kindergartners' SES, and this association will be stronger for low SES students.

Cognizant of the evidence on the moderating effect of professional development in associations between teacher characteristics and student achievement (Yoon et al., 2007; Cohen & Hill, 2001); the present study investigates whether professional development for kindergarten teachers would moderate the expected association between teachers' job satisfaction and students' achievement.

Research question 3: If a relationship exists between teachers' job satisfaction and Kindergartner's academic achievement, is this relationship moderated by teachers' professional development?

Professional development moderates teacher-child associations by positively impacting the quality of instructions teachers provide (e.g., Mikami, Gregory, Allen,

Pianta, & Lun, 2011). Therefore the current study expects stronger associations between job satisfaction and student achievement as professional development increases, and vice versa.

H_0^3: The impact of teachers' job satisfaction on Kindergartners' academic achievement will be moderated by teachers' professional development, and this association will be stronger as professional development increases.

CHAPTER III

METHODOLOGY

Data Source and Participants

This study utilized data from the Early Childhood Longitudinal Study, Kindergarten (ECLS-K) class of 1998-99. Sponsored by the National Center for Education Statistics (NCES), the ECLS-K data are ideal for studying the relationship between teacher characteristics, children's socioeconomic status and their academic achievement. Designed to focus on children's early school experiences, the ECLS-K is a nationally representative sample of 21,409 children who entered kindergarten in 1998–99. The ECLS-K sampled schools within Primary Sampling Units (PSU). Once schools were sampled within PSU, children enrolled in kindergarten were sampled from schools.

The ECLS-K data included over 21,000 children, but the analytical sample in the present study is comprised of 11,734 children. This study excludes children who are missing entries on teachers' job satisfaction or spring test scores—the primary independent and dependent variables of interest (4,577); students who changed teachers between the fall and spring of kindergarten (443); and children attending private schools (4,655). Private schools were excluded because they were more likely to have students with higher SES backgrounds. This is because most private schools require tuition, making it possible for only parents with the financial resources to choose this option

(NCES, 1997). Also, compared to private schools, public schools tend to be more racially and ethnically diverse (NCES, 1997).

Data come from multiple sources including direct assessments of children, interviews with parents, and surveys of teachers and school administrators. The descriptive characteristics of the sample are presented in Table 1 below.

Measures

Kindergartners' academic achievement

In the ECLS-K, direct cognitive tests were designed to measure children's knowledge in literacy and mathematics during the fall and spring of kindergarten. The reading assessment was designed to measure basic skills such as print familiarity, letter recognition, beginning and ending sounds, and recognition of common words. The mathematics assessment was designed to measure conceptual knowledge, procedural knowledge, and problem solving.

These assessments were untimed and administered in a one-on-one setting with computer-assisted interviewing technology. For each subject area assessments were completed in two stages. First, children completed a routing test that included items from each ability level; then, they were given a test level commensurate with their performance on the routing test in each subject area. This two stage adaptive approach helped minimize floor and ceiling effects. In the ECLS-K achievement scores for each subject area are reported in different formats. Similar to the study by Schulting, Malone and Dodge (2005), the present inquiry uses the standardized scores (*T* scores) calculated for

each subject area. These scores were created by transforming the item response theory estimates, followed by rescaling the scores to have a mean of 50 and a standard deviation of 10. To create a composite academic achievement score for each child, the standardized achievement scores for reading and mathematics collected in the spring of kindergarten were averaged.

Teachers' job satisfaction

Teachers were asked to indicate their feelings about two statements related to their satisfaction: (a) I really enjoy my present teaching job and (b) If I could start over, I would choose teaching again as my career. The ECLS-K captures teachers' responses to the above questions using a 5-point scale: 1 (*strongly disagree*), 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*strongly agree*). Scores were summed to create a composite job satisfaction score. High scores indicate higher levels of job satisfaction and vice versa.

Professional development

The ECLS-K provides data on the professional development of teachers in schools, using the following statements which have been associated with the quality of professional development (DeMonte, 2013; Edmonds & Lee, 2002; Leukens, Lyter, & Fox, 2004; Jeffery, Constantine, Wellington, Hallgren, Glazerman, Chiang, & Speroni, 2014): (a) An active professional development program for teachers exists; (b) Teachers are very active in planning development activities in this school; (c) There is adequate time for teacher professional development and (d) Incentives are offered by the school for

teachers to improve their classroom management and instruction techniques. Responses were captured using a 5 point scale: 1 (*strongly disagree*), 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*strongly agree*). Scores were summed to create a composite job professional development score. Summed scores represent the quality of teachers' professional development, with high scores representing higher quality and vice versa.

Socioeconomic status

The parent interview for the spring kindergarten data collection asked questions on key issues such as family structure, the child's home environment, and measures of the child's socioeconomic status. A continuous measure of children's socioeconomic status is provided by the ECLS-K data. This measure is a composite of the following components: (a) father or male guardian's education, (b) mother or female guardian's education, (c) father or male guardian's occupation, (d) mother or female guardian's occupation, and (e) household income.

Controls

Informed by past literature and with an aim to avoid biasing estimates of the association between teachers' job satisfaction and Kindergartners' academic achievement, the current study controlled for the following variables which have been observed to impact the dependent variable of interest (children's early reading and math skills): Child level (kindergarten fall academic scores, child individualized education plan (IEP), child's race/ethnicity, child's age and child gender); Teacher level (teachers'

education, experience, age, gender and race/ethnicity); School level (school size, percentage of minority or non-White students and the receipt of title 1 funds, which refers to financial assistance provided to schools with high numbers of children from low-income families to help ensure that all children meet state academic standards (U.S. Department of Education, 2014).

Analyses

Missing data

The bootstrap multiple imputation technique was used to address missing data in the dataset, before running the analyses. This was done using the "Amelia" package with five imputations (Honaker, King, & Blackwell, 2011). Each of the five imputations was averaged to create the final dataset used for analyses. Standard errors were corrected using the formula given by Rubin (1987), which corrects standard errors to represent the uncertainty associated with the inflated sample size due to imputation. The Rubin equation is given by Equation 1, where M is the number of imputations, s^2 is the standard error associated with each beta estimate, b_k, and $\bar{b}$ is the average beta estimate across M imputations.

$$SE_{imp} = \sqrt{\frac{1}{M}\sum_{k=1}^{M} s_k^2 + (1+\frac{1}{M})(\frac{1}{M-1})\sum_{k=1}^{M}\left(b_k - \bar{b}\right)^2}$$

Data analyses

Preliminary data analyses involved the calculation of Pearson correlation coefficients for the continuous variables to assess the strength and direction of associations that exists between variables. For the main data analyses, hierarchical linear modelling (HLM) is used. This is because of the nesting of children within classrooms and classrooms within schools, and the likelihood that children within a classroom who share the same teacher are more alike than children across classrooms. Likewise, teachers within the same school may be more similar in terms of job satisfaction and professional development experiences, than those across different schools. Analyses that take this nesting into account are necessary to determine the true relationship between variables in nested data (Raudenbush & Bryk, 2002).

Weights

Analyses using the ECLS-K data require the use of design weights to compensate for the stratified sampling strategy and unequal probabilities of selection (specifically, the present study must compensate for the intentional oversampling of Asian/Pacific Islander children and fixed numbers of children selected in school regardless of their size) and to adjust for the effects of nonresponse. Thus, the results of weighted analyses using the ECLS-K data are generalizable to the U.S. population of kindergarten children and teachers in the 1998-199 school year. Analyses in the present study are weighted using the child-level weight of C2CW0 of Wave 2 of the ECLS-K.

Multilevel modeling

Each of the hypotheses were modeled using multilevel regression analysis. This was done to take the hierarchical structure of the data into account and control for the effects of the clustering of students into the same classrooms and schools. It was expected that the dependent variable would have different mean values for each teacher and school, and these differences must be taken into account in order to isolate the effects of the independent variables. Hierarchical Linear Modelling (HLM) allows for the inclusion of both fixed and random effects to take into account the differences between mean values of groups in the dependent variable. The random effects in HLM refer to model parameters that are allowed to vary across groups. In this case, the intercept values were allowed to vary for teachers within schools.

Assumptions

HLM assumes the normality of residuals, and independence of errors of the outcome and predictor variables. These were examined using the Q-Q plot and a residuals scatterplot respectively. As shown in Figure 1, the residuals do not appear to deviate from normality, so the assumption of normality was met. The model residuals appear to be symmetrically distributed, with no apparent trend or pattern as shown in Figure 2, so the independence assumption is also met.

Moderation analysis

To test for moderation, the dependent variable (student achievement) was regressed on the independent variable (teacher job satisfaction) and the specified moderators (SES and professional development) to obtain regression coefficients for

each. Subsequently, an interaction term is included between the independent variable and each moderator. The interaction term models the conditions in which the independent variable affects the dependent variable. If the interaction term is significant, the effect of the independent variable on the dependent variable is said to be moderated by the moderating variable.

CHAPTER IV

RESULTS

Preliminary Findings

Descriptive statistics were calculated for the total sample. A frequency table was constructed for all of the nominal variables as seen in Table 1. The sample was comprised of children, teachers, and schools. Most children in the sample were White (65.0%) and male (51.4%). A majority of students had teachers who were White (87.3%) and female (98.4%). Over a third of teachers had at least one year of course work (but not a graduate degree) beyond a bachelor's (34.6%). Over a third of students attended schools with enrollments of 500-749 students (34.6%). Of all the students in the sample, 7,571 attended schools receiving title I funds (64.5%). The average age for students was 5.7 years (*SD* = 4.37); and 41.92 years (*SD* = 10.01) for teachers. On average teachers had 10 years of teaching experience. Students had higher mean student achievement scores in the spring of kindergarten (50.22) compared to the fall term (49.88). Means and standard deviations for all continuous variables are given in Table 2.

The correlation among variables is presented in Table 3, which indicates the varying degrees of relationship between variables. In the current study, the possible minimum job satisfaction score was 1 and the maximum was 10. The mean job satisfaction score for the current sample was 8.84. Pearson correlation coefficients

between continuous variables (Table 3) indicate a significant positive correlation between teachers' job satisfaction and kindergartners' academic achievement, $r(11,732) = 0.23$, $p = 0.04$; SES, $r(11,282) = 0.04$, $p = 0.00$; and child age r $(11,731) = 0.02$, $p = 0.02$.Teachers' job satisfaction was also significantly and positively correlated with teachers' professional development, $r(9,652)=0.13$, $p=0.04$. Reliability estimates were calculated for the composite scores of teacher satisfaction (0.73), and professional development (0.76) respectively.

Main Findings

Relationship between teachers' job satisfaction and kindergartners' academic achievement

To examine the first hypothesis, a multilevel regression analysis was conducted to determine if teacher's job satisfaction had a significant effect on kindergartners' academic achievement. The continuous variables were standardized prior to estimating the models.

Likelihood ratio tests. Prior to interpreting the individual coefficients, multilevel models were first tested against a null model, or intercept-only model to determine if the inclusion of predictors significantly improves overall model fit. The intercept only model examines the variation in the dependent variable (spring achievement scores) by the differences in group mean values without including any other predictors.

The likelihood ratio statistic was used to determine if the alternative model had significantly better model fit than the null model. The model was specified using random

intercepts for teachers at level 2, and schools at level 3. The null model included both random intercept terms, but the only fixed effects in the model were the intercept terms. The alternative model for hypothesis 1 included both random intercept terms, and all predictors as fixed effects. The results showed that the random intercepts model with predictors included had significantly better model fit than the intercept only model ($\chi^2(32) = 15{,}117$, $p < .001$). A comparison of the *AIC* scores for the alternative model (*AIC* = 17,395, *df* = 36) and the null model (*AIC* = 32,448, *df* = 4) indicates that the alternative model has a better overall fit. This suggests that including teacher job satisfaction, fall scores, IEP, race, child age, child gender, teacher age, teacher gender, teacher education, school size, percentage of minorities, and receipt of Title I funding accounted for significantly more of the variation in student achievement, than the null model. The results of the likelihood ratio test are shown in Table 4.

In addition to a random intercepts model, a multilevel model with a random effect for teacher job satisfaction was also estimated, which allowed the coefficient for teacher job satisfaction to vary between different schools. The results were not significant ($\chi^2(4) = 7.65$, $p = .105$). This indicates that including a random slope term for Teacher Job Satisfaction did not significantly improve the model fit. A comparison of the AIC scores for the random intercepts model (*Model 1: AIC* = 17,395, *df* = 36) and the random intercepts and slopes model (*Model 1b: AIC* = 17,395, *df* = 40) indicates that the difference in model fit is negligible. Since the random slopes model did not show significant improvement, the random intercept model was chosen because it is a more

parsimonious model (it does not estimate as many parameters). The results of the likelihood ratio test are shown in Table 5.

Since the likelihood ratio test showed significance, the coefficients for each of the predictors were examined. The standard errors were corrected for five multiple imputations using Equation 1. This adjusts the standard errors to reflect the uncertainty due to the imputed missing data. For the research variable, teacher job satisfaction, the *B* coefficient was near 0, and did not show significance ($B = 0.00$, $p = .411$). This indicates that there is no significant relationship between teacher job satisfaction and kindergartners' academic achievement. Although teacher job satisfaction was not a significant predictor of student academic achievement, fall scores, IEP and the White ethnic group were all significant predictors of Student Academic Achievement. The results show that an increase of 0.83 standard deviations in student academic achievement was associated with each standard deviation increase in fall scores ($p < .001$). Students who had an IEP on record tended to have student academic achievement scores that were associated with a 0.14 standard deviation lower on average ($p < .001$). Membership in the Black ethnic group was associated with a decrease in student achievement by 0.14 standard deviations ($p < .001$). The model coefficients for the random intercepts model are shown in Table 6.

Likelihood ratio test for categorical variables. To determine if the categorical variables in the model were significant overall, a series of likelihood ratio tests were conducted between the intercept-only model, and the model with the dichotomous

indicators for each categorical variable included. The likelihood ratio test determines whether there are significant differences in the likelihood values of two models. Models with significantly higher log-likelihood values are said to fit the data better than models with lower log-likelihood values. Table 7 outlines the results of each likelihood ratio test for significant categorical predictors.

IEP. The IEP variable showed significance for the No category relative to the Yes category (B = -0.14, p < .001). A likelihood ratio test was conducted to determine if the IEP variable had a significant effect overall. The likelihood ratio test indicated that the inclusion of IEP in the model significantly improved model fit over the intercept-only model ($\chi^2(1) = 202.7$, $p < .001$). This indicates that IEP was a significant predictor overall. Kindergartners who did not have an IEP had higher achievement scores, and vice versa.

Child Race. Two categories for child race were significant. The Black category showed a significantly lower mean student achievement score relative to the White category (B = -0.14, $p < .001$). The Hispanic category also showed a significantly lower student achievement score relative to the White category (B = -0.05, $p = .012$). A likelihood ratio test was conducted to determine the overall effect of including child race in the model. The results indicated that including Child Race in the model significantly improved the fit of the model from the intercept-only model ($\chi^2(6) = 515.72$, $p < .001$). This indicates that child race was a significant predictor overall.

Child Gender. A likelihood ratio test was conducted to determine if including child gender significantly improved the model fit. The results indicated that the inclusion

of child gender in the model did not significantly improved the fit over the intercept-only model ($\chi^2(1) = 63.37$, p =211). This indicates that child gender was not a significant predictor overall.

Teacher Race. A likelihood ratio test was conducted to determine if including teacher race significantly improved the model fit. The results indicated that the inclusion of teacher race in the model did not significantly improved the fit over the intercept-only model ($\chi^2(1) = 14.30$, p =.140). This indicates that teacher race was not a significant predictor overall.

Teacher Gender. A likelihood ratio test was conducted to determine if including teacher gender significantly improved the model fit. The results indicated that the inclusion of teacher gender in the model did not significantly improve the fit over the intercept-only model ($\chi^2(1) = .0118$, p =.914). This indicates that teacher gender was not a significant predictor overall.

Teacher Education. A likelihood ratio test was conducted to determine if including teacher education significantly improved the model fit. The results indicated that the inclusion of teacher education in the model did not significantly improve the fit over the intercept-only model ($\chi^2(1) = 9.2261$, p = .056). This indicates that teacher education was not a significant predictor overall.

Title 1. A likelihood ratio test was conducted to determine if including the Title 1 variable significantly improved the model fit. The results indicated that the inclusion of Title 1 in the model significantly improved the fit over the intercept-only model ($\chi^2(1) = 84.081$, p = <.001). This indicates that Title 1 was a significant negative predictor overall.

Percent Minorities. A likelihood ratio test was conducted to determine if including the percent minorities variable significantly improved the model fit. The results indicated that the inclusion of percent minorities in the model significantly improved the fit over the intercept-only model ($\chi^2(1) = 170.42$, $p = < .001$). This indicates that percent minorities was a significant predictor overall. The increase in the percent of minority students in schools was associated with lower achievement scores, thus depicting a negative relationship between percent of minority students in schools and kindergartners' academic achievement.

School Size. A likelihood ratio test was conducted to determine if including school size significantly improved the model fit. The results indicated that the inclusion of school size in the model did not significantly improve the fit over the intercept-only model ($\chi^2(1) = 4.7331$, $p = .316$). This indicates that school size was not a significant predictor overall.

The relationship between teachers' job satisfaction, kindergartners' SES and achievement

To assess whether kindergartners' SES significantly moderates the relationship between Teacher Job Satisfaction and student academic achievement, the kindergartner SES variable was added to the multilevel regression model. The kindergartner SES moderator had a beta coefficient of 0.03, $p < .001$. This indicates that SES is a significant predictor of student academic achievement. A beta of 0.03 indicates that a standard deviation increase in SES, is associated with an increase of 0.03 standard deviation in student achievement scores on average. However, there was no significant relationship

between teacher job satisfaction and student academic achievement. The results of the initial model are shown in Table 8.

To test whether SES was a significant moderator between teacher job satisfaction and student academic achievement, an interaction term was included in the model for teacher job satisfaction and SES. The interaction term was not significant ($B = 0.00$, $p = .409$). This indicates that there is no significant interaction between teacher job satisfaction and SES. Therefore, SES does not moderate the relationship between teacher job satisfaction and student academic achievement. The results of the model are shown in Table 9.

The relationship between teachers' job satisfaction, professional development and kindergartners' achievement

To assess the influence of professional development on the relationship between teacher job satisfaction and student academic achievement, a professional development moderator variable was added to the multilevel regression model. Professional development did not show significance in predicting student academic achievement ($B = 0.01$, $p = .264$). This indicates that professional development is not a significant predictor of student academic achievement. Additionally, the model did not find a significant relationship between teacher job satisfaction and student academic achievement. The results are shown in Table 10.

To determine if professional development was a significant moderator between teacher job satisfaction and student academic achievement, an interaction term was included in the model for teacher job satisfaction and professional development. The

interaction term was not significant ($B = 0.00$, $p = .655$). This indicates that there is no significant interaction between teacher job satisfaction and professional development. Therefore, professional development does not moderate the relationship between teacher job satisfaction and student academic achievement. The results of the model are shown in Table 11.

CHAPTER V

DISCUSSION

Research indicates that teachers' characteristics are predictors of students' early academic achievement (Ready & Wright, 2011; Konstantopoulos, 2011). However, important questions remain about what teacher characteristics bring about these effects and the factors that exacerbate or diminish them. This study sought to shed some light on these questions by investigating one teacher characteristic which has been understudied, despite evidence of its significant role in determining teachers' behavior (Veldman, Tartwijk, Brekelmans, & Wubbels, 2013; Bingham, 1996; Amit, 1994)—teachers' job satisfaction, and whether it impacts kindergartners academic achievement. Also of interest was whether students' SES and teachers' professional development—two constructs known to moderate teacher-child associations, would moderate the expected satisfaction-achievement association. A subset of kindergartners from the ECLS-K study was analyzed and the results are discussed below.

Job Satisfaction and Academic Achievement

Contrary to the intuitive thought and common expectation that teachers' job satisfaction would impact students' scores (Fisher, 2003), no significant association was found. This lack of a significant relationship between teachers' job satisfaction and student achievement, though seemingly counterintuitive is consistent with previous

research (Iaffaldano & Muchinsky, 1985; Fisher, 2003). However, Judge, Thoresen, Bono and Palton, (2001) found a moderate positive relationship between job satisfaction and achievement. Results from their meta-analytic study revealed variations in the strength of the relationship across study samples, which they attributed to moderating factors. Therefore, the absence of a significant relationship between teachers' job satisfaction and kindergartners' academic achievement in the present study may be attributed to the exclusion of these moderators which are described in the following section.

Moderators

Referred to as situational strengths, some moderators have been identified as substantive factors in the work environment (Bowling, Khazon, Meyer, & Burrus, 2015), and have been argued to be among the most important and psychologically meaningful ways to conceptualize the behaviorally relevant forces of work environments (Meyer & Dalal, 2009; Johns, 2006; Weiss & Adler, 1984). Situational strength reflects the degree to which a situation contains cues that make it obvious how one is expected to behave (strong leadership); the degree to which the situation limits or promotes one's choice of behavior (autonomy); and the degree to which the situation includes incentives that are relevant to these behaviors (Bowling, Khazon, Meyer, & Burrus, 2015).

Strong leadership. Results from Weber's (1971) investigation of four inner city schools, where the academic achievement of students had been raised revealed that all the schools had strong leadership. That is, in each of the four schools, the principal had high

expectations and was key in setting the tone of the school. All four schools strongly emphasized a commitment to pupils' academic achievement. Following Weber's study, in 1974 the state of New York's Office of Education Performance Review (1974) published a study that confirmed some of Weber's (1971) findings. New York identified two inner-city New York City public schools, one of which was high-achieving and the other low achieving. Both schools were studied in an attempt to identify those differences that seemed most responsible for the achievement variation between schools. Results revealed that the differences in student performance in both schools seemed to be attributed to factors under the schools' control. These were administrative behavior, policies and practices which had a significant positive impact on teachers' feelings about their job and subsequently student achievement. In a latter more rigorous study, Madden, Lawson and Sweet (1976) studied 21 pairs of California elementary schools, where pupils differed only on their academic achievement scores. Similar to the findings of the Weber and New York studies, Madden et al. (1976) found that in comparison to teachers at lower achieving schools, teachers at higher achieving schools reported greater amounts of principal involvement and support. Additionally, Madden et al. (1976) found that in comparison to teachers in lower-achieving schools, teachers in schools with higher student achievement scores reported being more satisfied with various aspects of their work.

Autonomy. The definition of autonomy is ambiguous in the literature, but has been described as the perceptions that teachers have regarding whether they control themselves

and their work environment (Pearson & Hall, 1993). Autonomy at work has been linked to psychological health (Trepanier, Fernet, & Austin, 2013). Lower levels of job autonomy have been linked to diminished personal accomplishments and a depersonalized attitude which depletes productivity (Maslach, Schafeli, & Leiter, 2001; Crodes & Dougherty, 1993). On the other hand, greater autonomy has been linked to improved personal growth and team work, greater satisfaction and responsibility towards work (Huang, 2011).

Advocates for teachers' autonomy note that promoting teachers' autonomy will make the teaching profession more attractive and improve the quality of learning opportunities and students' experience. Renzuilli, Parrot and Beattie (2011), using data from the 1999-2000 Schools and Staffing Survey data provide support for this latter perspective. They found that teachers in charter schools were more satisfied than teachers in public schools because of greater autonomy. In particular, researchers note that, autonomy may be especially important for kindergarten teachers, who in contrast to the present times used to experienced significant autonomy, including the freedom to rely on their professional expertise in making classroom decisions (Laverick, 2007; Mathison & Freeman, 2003). According to Ingersoll (1996), one way through which autonomy impacts teachers' satisfaction is its association with diminished incidences of conflict between teachers, students and teachers, and teachers and principals.

Incentives. Approximately 95 percent of K-12 teachers in the U.S. work in a school or district with a salary schedule that provides salary increases largely based on

years of experience and number of degrees attained (Podgursky & Springer, 2007). This "single-salary schedule" which was developed to address equity issues makes no considerations on measures of actual teaching and students' performance (Glazerman, Chiang, Wellington, Constantine, & Player, 2011). This system assumes that teaching ability improves with more years of experience and higher degrees (Barnett, Ritter, Jensen, Lo, & Denny, 2014). However, substantial evidence has shown that additional degrees do not necessarily result in enhanced student learning, and that after several years the benefits accrued through teacher experience levels off (Hanushek, 2007; Goldhaber, 2002).

For effective teachers, the single-salary system provides few opportunities for their efforts to be recognized and or rewarded, leading some to leave their jobs (Barnett, Ritter, Jensen, Lo, & Denny, 2014). Because of this, for over 50 years, there has been significant efforts to provide teachers with "merit pay" incentives (Springer, 2009). This compensation approach provides teachers with additional financial compensation based on among other things, how well students perform on measures of student learning.

The first of four planned reports of a multiyear study focusing on the Teacher Incentive Fund (TIF) grants awarded in 2010 (Jeffery, Constantine, Wellington, Hallgren, Glazerman, Chiang, & Speroni, 2014) examined teacher outcomes in 10 districts, near the end of the first year of the program. The results showed that most teachers (about two-thirds) were satisfied with their jobs overall and were glad to be participating in the TIF program. In addition, more of the teachers in schools offering incentive pay based on

performance, were satisfied with the opportunity to earn additional pay (64 versus 59 percent).

Ritter and Barnett (2013) note some of the ways an incentive based system impacts teachers and students for better. They explained that an incentive based system encourages teachers to strive for higher student achievement. Also they point out that the recognition and or rewards that follow teachers commitment to students' achievement in turn, is associated with increases in job satisfaction and lower teacher turnover (Ritter & Barnett, 2013).

Global job satisfaction vs. facets of job satisfaction

The absence of a significant effect between teachers' job satisfaction and students' achievement in the current study may lie with the operationalization of the job satisfaction construct. Kluger and Tikochinsky (2001) make this point in their explanation of why a seemingly unsupported common sense theory could still be correct. They noted that although the examined relationship may seem weak, a stronger relationship may emerge if a different operationalization of job satisfaction is tested.

In investigating job satisfaction, a distinction can be made between a global feeling and a constellation of related feelings about specific facets of the job (Strumpfer & Mlonzi, 2001), such as the work itself, pay, advancement, supervision and co-workers (Fisher, 2003). The former description provides general information, while the latter provides information on specific parts of the job (Strumpfer & Mlonzi, 2001). Kerber and Campbell (1987) note that measures of facet job satisfaction may be better linked to

individuals' work behavior and performance because of the explicit links to the job and work environment provided by this alternate conceptualization. There exists evidence linking teachers' satisfaction with specific parts of the job to student achievement. For example, Madden et al. (1976) found that teachers who reported being satisfied with their classroom curriculum had higher student achievement scores.

Direction of effects

The results of the current study are based on cross-sectional data of the ECLS-K (1998/1999). This is important to point out because teachers completed self-administered questionnaires when children were assessed (ECLSK Base year codebook, 1999). This suggests that children were assessed before teachers self-reported on their job satisfaction levels. It is arguable then that children's academic performance may have had some impact on teachers' reported job satisfaction. This perspective is consistent with the knowledge that many teachers enter the profession to make a positive difference in children's lives (Osguthorpe & Sanger, 2013; Watt & Richardson, 2007). The findings of Kelley, Odden, Milanowski and Heneman (2000) provide support for this perspective. They showed that teachers' derived satisfaction from seeing improvements in their students' achievement scores. Although correlation coefficients do not suggest causation, or the direction of effects, it is relevant to note that findings in the current study revealed a significant and positive association between students' academic achievement and teachers' job satisfaction.

Job Satisfaction, SES, Professional Development and Academic Achievement

Tests of moderation were conducted to examine whether the hypothesized relationship between teachers' job satisfaction and kindergartner's achievement would be moderated by SES and by teachers' professional development—two factors that have been shown to vary the effects of teachers on students' academic achievement. Interaction effects were not significant. This seems to have resulted because of the unexpected weak relationship found between teachers' job satisfaction and kindergartner's achievement. As Chaplin (1991) and Jaccard, Turrisi and Wan (1990) noted, moderator effects are best detected when the relationship between the predictor and outcome is substantial. However, a direct relationship of SES to academic achievement emerged, and a significant positive correlation between teachers' professional development and kindergartners' academic achievement was observed.

SES

Previous studies have showed SES to significantly impact students' academic achievement (e.g., Nesbitt, Baker-Ward & Willoughby, 2013; Mistry, Benner, Biesanz, Clark & Howes, 2010; Snyder & Dillow, 2011). As documented in the literature, pervasive gaps in math and literacy achievement between high- and low-SES students are evident as early as kindergarten (Mistry et al., 2010; Snyder & Dillow, 2011). Although these gaps begin to develop before children begin school (Blair, 2010), they persist as observed in the current study, and widen further over time following school entry (Ready, 2010).

Efforts have been made to explain the widening of achievement gaps following school entry. Tach and Farkas (2006), noted that socioeconomically disadvantaged children are disproportionately assigned to ability groups and to programs that afford limited resources and opportunities to learn. For example, lower SES children are more likely to experience larger class sizes (Ready & Lee, 2007; Loeb, Darling-Hammond, & Luczak, 2005) and remedial coursework that involves rote teaching and low level academic content (Levin, 2007; Oakes, Gamoran, & Page, 1992), Socioeconomically disadvantaged children are also more likely to experience teachers who have lower test scores, lack certification and do not have graduate degrees (Lankford, Loeb, & Wyckoff, 2002; NCES, 1997; Oakes, 1990). Additionally, students' SES has been associated with teachers' job satisfaction. Ryoji (2015) found that teachers' job satisfaction was related to students' SES, and this relationship was mediated through the frequency of students' behavioral issues. In addition to impacting teachers' job satisfaction, the New York's Office of Education Performance Review (1974) and more recently Ready and Wright (2011) found that students' SES predicted the expectations teachers had of students and consequently teacher child interactions, creating an environment in which low-SES children often failed because teachers did not expect them to succeed.

Professional development

No significant moderating or direct effects were found for professional development in the current study. However, it is important to note that findings on the effects of professional development are mixed (Yoon et al., 2007). Reviews of studies

and evaluation of programs indicate that the power of professional development to impact teachers' satisfaction and student achievement depend on the following professional development characteristics, which were absent in the present study: (1) The amount of time spent on professional development (2) The degree to which the professional development is embedded in teachers' curriculum and daily practices; and (3) The provision of coaching and follow-up support alongside professional development.

The amount of time teachers spend on professional development is a significant predictor of whether or not student achievement will be impacted. Researchers and practitioners emphasize that replacing traditional programs of professional development —usually single event, so called "drive by" interventions with longer-term designs increases the chance that teachers will enhance student academic achievement (DeMonte, 2013). In a review of 1,300 studies, Yoon et al., (2007) found that when teachers participated in professional development for more than 14 hours, a positive and significant effect was observed on student achievement. On the other hand, for studies that involved 5-14 hours of professional development, no significant effect was found on student academic achievement. This suggests that the more time teachers spend on professional development, the greater the chances that they will adapt their practices and enhance student achievement. Also, Luekens, Lyter and Fox (2004) found that teachers who reported having adequate time for professional development were more satisfied and less likely to leave their job, compared to teachers who reported having little time for the same activities.

Adequate time for professional development is important however, studies show that more time alone does not guarantee teachers' satisfaction or subsequent growth in student achievement. If professional development opportunities are not linked to the curriculum and teachers' experiences, then the duration of program exposure will less likely lead to teachers' satisfaction with programs, a change in teachers' practices, and or subsequent enhanced academic achievement for students. The term *job embedded* has been used in the literature to describe this high-quality trait of professional development. According to Croft, Coggshall, Dolan, Powers, and Killion (2010), professional development is job embedded when it is: (i) grounded in teachers' day-to-day teaching practice and is designed to enhance their instructional practices around content (ii) integrated into the workday and part of a continuous improvement cycle (iii) intended to improve student learning, and (iv) directly connected to learning and application in daily practice. Cohen and Hill (2001) found that when professional development focused on the curriculum teachers would be teaching, then teachers were more likely to report satisfaction with the program and adopt the practices taught. Results from this study also showed that students of teachers who participated in this kind of curriculum-focused professional development, showed improved achievement scores (Cohen & Hill, 2001). Finally coaching and follow-up may help teachers internalize what is being learned through observation and feedback and subsequently impact student achievement (Cooper, n. d.).

Other Findings

High job satisfaction

Public school kindergarten teachers in the current study expressed high levels of job satisfaction. This result contradicts the expectation of low levels job satisfaction for this sub-population of teachers' post-NCLB, given the accompanying challenges they face around student diversification and accountability tests. Explanations can be attributed to the time period of data collection—1998 to 1999.

In the 90s relatively high levels of job satisfaction for public school teachers was reported, especially when compared to the job satisfaction levels of private school teachers (e.g. NCES, 1997). Even though increasing diversification of the student body, a potential challenge for teachers was reported in the 90s (Roekel, 2008), teachers continued to experienced significant autonomy to engage children, with the primary goal of creating a place for children to learn to socialize through play (Goldstein, 2008). Thus the autonomy and primary role of kindergarten teachers were essentially unchanged. However, in 2002 the signing of the NCLB into law changed the status-quo in kindergarten classrooms (Dever & Carlston, 2009).

The NCLB law required that all students, including those from diverse and or low-income backgrounds, and those with disabilities meet specified academic standards in reading and math (Thiede, 2005). This mandate necessitated the administration of standardized tests in reading and math in kindergarten classrooms to ensure that students were making progress towards federally mandated third grade tests (Feeney & Freeman,

2014). Marxen, Ofstedal and Danbom (2008) noted that these demands led to a transformation of kindergarten classrooms from a place for socialization through play to extensions of first grade. These changes in kindergarten's role have also caused a significant increase in obligation, accountability, and centralized control and a decrease in autonomy (Laverick, 2007; Mathison & Freeman, 2003).

The effects of these changes on teachers' satisfaction levels have been reported in the literature. Kindergarten teachers have expressed dissatisfaction in their job about their eroded autonomy along with the specified curriculum expectations, which emphasize literacy and math, while downplaying activities such as music, art and physical education (Dever & Carlston, 2009). Dissatisfaction with the developmental inappropriateness of the format for administering tests, have also been expressed by teachers. There is the concern that for the many ELLs who are often not yet proficient in English to read and understand questions, the paper-and-pencil format of the test is unsuitable (Feeney & Freeman, 2014). Also teachers have expressed dissatisfaction with the requirement for kindergarteners to fill in bubbles on scantron sheets for tests, noting that some kindergarten children still lack sufficient fine motor skills for this task (Dever & Carlston, 2009).

Child race

In the present study, child race was found to be a significant predictor of student achievement. Specifically kindergartners in the Hispanic racial group scored lower than kindergartners in the White racial group. Also, kindergartners in the Black racial group

scored lower than kindergartners in the White racial group. These findings are consistent with previous studies which have documented the racial achievement gap (e.g., Desimone & Long, 2010; Murnane, Willett, Bub, & McCartney, 2006; Quinn, 2015). Students' race has also been found to be associated with teachers' job satisfaction. Stearns, Banerjee, Mickleson and Moller (2014) using a sample of kindergarten teachers, found that compared to African-American teachers and Latino teachers, White teachers are significantly less satisfied when they teach in majority non-White classrooms. Exploring differences in teacher satisfaction and academic achievement across racial/ethnic groups is an important line of inquiry, given the increasing diversity of the U.S. student population, and the relatively high rates of growth among the subpopulations that tend to be negatively impacted by persistent achievement gaps (Mickelson, Botia, & Lambert, 2013).

Individualized education plan (IEP)

Whether or not students had an individualized education plan (IEP) was related to their academic scores in the present study, a finding consistent with previous research (Boser, 2009). The special education population is varied, and so individual students will be able to achieve at different levels, this is why special education requires individualized education plans (Boser, 2009). However, many in the special education community argue that the majority of special education students can be expected to perform at levels similar to their general education classmates (Boser, 2009). This is largely due to the broad spectrum of needs that now exists among the special education student population.

It is important to highlight that the number of students with disabilities has risen over the years. In 1976, just 5 percent of students received special education services under IDEA. But, by 2006, that number had almost doubled to 9 percent (U.S. Department of Education, 2006). Factors behind this growth include, the greater public awareness and acceptance of disabilities and the loosening by the Federal government of the definition of disability within some categories (Boser, 2009). For example, students with ADD and ADHD were not eligible for special services under IDEA until the early 1990s. The definition of autism has also been expanded to include students with mild cases. In the past many of these students would have been identified as low achievers (Horn & Tynan, 2001). So in general, of the students who receive special education—a diverse group—only a fraction suffer from severe disabilities, most are diagnosed with disabilities that do not necessarily mean reduced mental ability (Boser, 2009).

Following the latest re-authorization of IDEA, general education teachers are now responsible for the development and implementation of students' IEPS (Lee-Tarver, 2006). However, concerns exist about the utility of IEPs for general education teachers given Giangreco, Dennis, Edelman and Chigee's (1994) earlier review of IEPS to determine whether they provided relevant guidance to general education teachers on curriculum and instruction. Results revealed that IEPs were broad and inconsistent with the general education classroom, and some teachers reported not utilizing them for these reason. More recent research indicates that the previously reported misfit of IEPs to students' and teachers' needs persists. For Example, Rotter (2014) found that teachers

lack of access to simplified IEPs and difficulties in adapting existing IEPs for the distinct needs of students, impacted their satisfaction levels and use of IEPs.

High percent minorities

The present study found that in schools, the presence of a high percent of minority students was negatively associated with academic achievement scores. This result is consistent with other studies that indicate a negative relation between a high percent of minority students and academic achievement in early childhood (Kainz & Vernon-Feagans, 2007; Kainz & Pan, 2014). Conversely, diverse schools are associated with more equitable outcomes for students regardless of their race or socioeconomic backgrounds (Kaiz & Pan, 2014; Borman et al., 2004; Harris, 2006; Berends & Penaloza, 2010).

Studies have sought to understand the causal relationship between segregation and academic achievement. Addressing potential confounds due to differences in students' socioeconomic, academic and socio-emotional background characteristics, Kainz & Pan (2014) concluded that, "It's not the kids", that is, student background differences did not account for the disparity in achievement between high minority and diverse schools. Overall, Benson and Borman's (2010) findings revealed that, although academic growth before school entry was primarily associated with family contexts, during the school year it was more strongly tied to school characteristics. Further, Kainz and Vernon-Fargas (2007) provide compelling evidence of the magnitude of associations between high minority schools and early academic achievement. After controlling for variation in

achievement at kindergarten entry and growth overtime, due to important child and family characteristics, classroom characteristics (i.e., full-day kindergarten, comprehensive literacy instruction, proficiency composition) and school characteristics (i.e., urbanicity and poverty composition), they found that attending a school with a high percentage of minorities was associated with lower academic achievement at the end of kindergarten.

In an attempt to explain the high minority student effect, Kainz and Pan (2014) conditioned gains on teacher experience, literacy instruction and school poverty, but these variables did not diminish the observed effects. These researchers (Kainz & Pan, 2014) subsequently called for the consideration of teacher turnover to explain the negative effects of high percent of minority students on student achievement. Research indicates that teacher turnover increases with school's minority composition (Scafidi, Sjoquist, & Stinebrickner, 2005; Hanushek et al., 2002). This pattern can result in the most experienced teachers leaving segregated schools (Kainz & Pan, 2014).

These findings are consistent with those from the National Center for Education Statistics (NCES) (1997). Using data from the Schools and Staffing Survey, they found that teachers' satisfaction varied with the percent of minority students in a school. Amongst teachers in low minority public elementary schools almost 75 percent reported being highly or moderately satisfied. On the other hand, amongst teachers in high minority public elementary schools about 60 percent reported being highly or moderately satisfied, meaning that, about 1 in 3 teachers reported low satisfaction levels which have

been linked to teacher turnover. Black students seem to be most affected by this pattern, as they are more likely than White students to be taught by a novice teacher (Clotfelter, Ladd, & Vigdor, 2005). Kainz and Pan (2014) provide further support, they note that frequent teacher turnover and a high proportion of novice teachers in a school was negatively associated with students' scores.

Title 1 funded schools

In the present study, kindergartners' academic achievement was impacted by whether or not they attended schools that were recipients of Title 1 funds. There was a negative relationship between attendance at a school recipient of Title 1 funds and academic achievement. This finding is consistent with previous research (U.S. Department of Education, 2001) and re-iterates the rationale for the Federal government's continuous involvement in the Title 1 Elementary and Secondary Education Act. Since its original enactment in 1965, Title 1 has been intended to improve the learning of children in high poverty schools, with a particular focus on those children whose previous achievement have been low (U.S. Department of Education, 2001). Title 1 schools also have to contend with teachers who are more likely to report low satisfaction levels. Results from NCES (1997), showed that elementary teachers in Title 1 public schools are more likely to report low levels of satisfaction than their counterparts in schools not categorized as Title 1.

In the search for practices to boost poor students' achievement, the U.S. Department of Education's (2001) longitudinal study provided strong support for high

quality professional development of teachers. Results showed that students' scores were positively associated with teachers' report of high quality professional development. In addition, teachers were more likely to report being highly satisfied when the quality professional development was high. Conversely, teachers who received no professional development the previous year performed worse on student achievement, in addition to reporting lower levels of satisfaction.

Limitations and Future Studies

The current study consisted of only kindergartners in public schools, hence caution should be exercised in generalizing the findings and observations made to other populations. Also, the findings presented are based on cross-sectional data, which may have impacted the strength of the associations observed. Relatedly, future studies should consider other possible consequences of teachers' job satisfaction on students, which may be observable and measurable, within a relatively shorter period of time. Examples would include the quality of instruction and learning opportunities offered to children, which are also linked to students' achievement.

A main problem in the study of teachers' job satisfaction is the plurality of conceptualizations that exist for this construct in the literature. Though, broadly there exists on the one hand global satisfaction, and on the other, facets-constituted satisfaction, no consensus exists within each category. This has led to the existence of several instruments that measure this phenomenon. Consequently, results from studies are often incomparable. Future researchers examining teachers' job satisfaction should

therefore exercise caution in selecting instruments. It would be helpful to aim at choosing an instrument that is specific to the study population and reflects the interest(s) of the study.

Social and behavioral skills, such as attention and ability to control impulses have important and substantial effects on young children's academic achievement, through their effects on children's ability to optimally utilize opportunities to learn in the classroom (Jennings & DiPrete, 2010). However, very few studies have attempted to estimate teachers' effects on these skills (Jennings & DiPrete, 2010). This is an important omission for two reasons—social behaviors are most malleable in young children (Hawkins, Kosterman, Catalano, Hill, & Abbot, 2005; Hawkins, Guo, Hill, Battin-Pearson, & Abbot 2001; Campbell, Ramey, Pungello, & Miller-Johnson, 2002) and behaviors formed early in life have long-lasting consequences (Bourdieu, 1984). Future studies should investigate whether and how teachers' job satisfaction may impact young children's social and behavioral skills, to ensure that we more fully understand the possibly varied pathways through which teachers' job satisfaction may impact student achievement.

Finally, as is the case in the present study, investigations examining teacher-child associations are often presented in a unidirectional manner, where teacher characteristics are hypothesized to impact student outcomes. However, existing evidence indicates that students' characteristics also impacts teachers. This is a valid perspective for future studies to consider and account for, in particular because altruism and regard for others

are two factors that commonly bring people to the teaching profession (Osguthorpe & Sanger, 2013). Satisfaction levels may therefore be impacted by how well teachers' assess their students' are doing.

Conclusion

As kindergarten teachers face increasing challenges in meeting changing policy goals at the school level and the varied needs of diverse children at the classroom level, there are concerns about how they feel about their work—their job satisfaction and the consequences for students' outcomes, like academic achievement. Interest also exists about how factors like teachers' professional development and students' socioeconomic status may diminish or exacerbate the aforementioned association. Findings in the current study further this inquiry in the following ways.

First, the results indicate that teachers' general satisfaction is not significantly associated with students' academic achievement. This finding provides support for Bronfenbrenner's PPCT model, which notes that person characteristics though important are only able to impact child developmental outcomes to the extent that they significantly influence relevant proximal processes (Bronfenbrenner & Morris, 2006). Other studies which highlight the weak impact of general job satisfaction on proximal processes and performance (Kerber & Campbell, 1987) underscore this point. Second, the current findings highlight the need to critically consider the facet-specific conceptualization of the job satisfaction construct in further investigations examining possible association between job satisfaction and students' academic achievement. Lastly, this study calls

attention to the need for further investigation of the seemingly commonsensical construct—teachers' job satisfaction, its predictors and impact on teachers and students; and how these possible association may be moderated by factors relevant and often present in classroom and school settings, like students' socioeconomic status and teachers' professional development.

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APPENDIX A

LIST OF TABLES

Table 1

Frequencies and Percentages for Demographic Variables (Weighted Estimates)

Variable	*n*	*%*
IEP On Record		
Yes	694	7.60
No	8,433	92.40
Child race		
2 or More Races	341	3.26
American Indian	259	2.47
Asian	567	5.42
Black	1,935	18.49
Pacific Islander	151	1.44
White	7,213	68.92
Child gender		
Male	6,034	51.43
Female	5,699	48.57
Teacher race		
2 or more races	3	0.03
Hispanic	234	2.01
American Indian	131	1.13
Asian	233	2.00
Black	834	7.17
White	10,193	87.66
Teacher gender		
Male	186	1.59
Female	11,527	98.41
Teacher education		
Bachelor's Degree	2,751	25.58
At least 1 year beyond Bachelor's Degree	3,719	34.58
Master's Degree	3,636	33.81
Education Specialist/Professional Diploma	625	5.81

Table 1 (continued)

Frequencies and Percentages for Demographic Variables (Weighted Estimates)

Variable	*n*	*%*
Doctorate	23	0.21
School size		
0 to 149	390	3.33
150 to 299	1,691	14.44
300 to 499	3,519	30.05
School size (contd.)		
500 to 749	4,058	34.65
750 and above	2,054	17.54
Percent Minorities		
Less than 10	3,579	30.99
10 to less than 25	2,142	18.55
25 to less than 50	2,107	18.24
50 to less than 75	1,327	11.49
75 or more	2,394	20.73
Title 1 funds		
Yes	6,544	64.42
No	3,614	35.58

Table 2

Means and Standard Deviations for Continuous Variables

Variable	*M*	*SD*	*min*	*max*
Student Achievement	50.22	9.01	18.31	83.36
Job Satisfaction	8.84	1.38	1.00	10.00
Child SES	-0.04	0.75	-4.75	2.67
Professional Development	13.35	5.96	1.00	20.00
Fall Scores	49.88	9.09	22.00	90.38
Child Age (in months)	74.82	4.37	59.43	102.30
Teacher Age (in years)	41.85	9.99	24.00	58.00
Teacher Experience	9.68	8.04	1.00	30.00

Note: Student achievement represents students' scores in the spring of kindergarten.

Table 3

Correlations between Continuous Variables

	1	2	3	4	5	6	7	8
1. Student Achievement	-							
2. Job Satisfaction	0.23*	-						
3. SES	0.39**	0.04**	-					
4. Professional Development	0.02	0.13*	0.02	-				
5. Fall Scores	0.85**	0.01*	0.42*	-0.01	-			
6. Child Age	0.18**	0.02*	-0.04*	0.00*	0.21**	-		
7. Teacher Age	-0.00	-0.01	0.02*	-0.02	-0.00	-0.00	-	
8. Teacher Experience	-0.03*	0.00	-0.01	0.01	-0.02*	0.02	0.56**	-

Note. * = $p < .05$. **$p<.01$

Table 4

Likelihood Ratio Test between the Intercept only Model and the Alternative Model

	df	*AIC*	*BIC*	*logLik*	*deviance*	χ^2	*df*	*p*
Null Model	4	32,448	32,478	-16,220	32,440			
Alternative	36	17,395	17,660	-8,661	17,323	15,117	32	<.001*

Table 5

Likelihood Ratio Test between Random Intercepts Model and Random Slopes Model

	df	*AIC*	*BIC*	*logLik*	*deviance*	χ^2	*df*	*p*
Model 1	36	17,395	17,660	-8,661	17,323			
Model 1b	40	17,395	17,690	-8,658	17,315	7.65	4	.105

Table 6

Hypothesis 1: Random Intercepts Model

	B	*SE*	*t*	*p*
(Intercept)	0.04	0.03	1.51	.132
Teacher Job Satisfaction	0.01	0.01	0.82	.411
Fall Scores	0.83	0.01	161.33	.000
IEP No (ref = Yes)	-0.14	0.02	-8.81	.000
2 or More Races (ref = White)	-0.02	0.02	-1.13	.259
American Indian (ref = White)	-0.08	0.05	-1.76	.079
Asian (ref = White)	0.03	0.03	1.12	.261
Black (ref = White)	-0.14	0.02	-8.72	.000
Hispanic (ref = White)	-0.05	0.02	-2.51	.012
Pacific Islander (ref = White)	-0.09	0.06	-1.40	.161
Child Age	0.00	0.00	-1.03	.301
Child Female (ref = Male)	0.03	0.01	3.15	.200
Teacher Race 2 or more races (ref = White)	0.03	0.33	0.09	.924
Teacher Race Hispanic (ref = White)	0.04	0.04	0.85	.393
Teacher Race American Indian (ref = White)	0.12	0.07	1.81	.070
Teacher Race Asian (ref = White)	0.10	0.06	1.75	.080
Teacher Race Pacific Islander (ref = White)	-0.01	0.03	-0.32	.747
Teacher Age	0.00	0.00	0.72	.474
Teacher Male (ref = Female)	0.01	0.05	0.10	.917
Teacher Years of Experience	0.00	0.00	-1.30	.194
Teacher Edu. Bachelor's (ref = One year above Bachelor's)	0.03	0.02	1.33	.183
Teacher Edu. Master's(ref = One year above Bachelor's)	0.01	0.02	0.85	.395
Teacher Edu. Professional (ref = One year above Bachelor's)	0.04	0.03	1.40	.161
Teacher Edu. Doctorate (ref = One year above Bachelor's)	-0.02	0.08	-0.20	.845
School Size 0-149 (ref = 300-499)	-0.09	0.06	-1.56	.120
School Size 150-299 (ref = 300-499)	-0.04	0.03	-1.27	.204
School Size 500-749 (ref = 300-499)	0.00	0.02	0.01	.995
School Size Above 749 (ref = 300-499)	0.03	0.03	1.05	.296
Percent Minorities 10-25 (ref = Less than 10%)	0.00	0.03	-0.09	.931
Percent Minorities 25-50 (ref = Less than 10%)	0.03	0.03	0.94	.349
Percent Minorities 50-75 (ref = Less than 10%)	0.05	0.03	1.42	.157
Percent Minorities 75 or more (ref = Less than 10%)	-0.01	0.03	-0.44	.662
Title I Funding No (ref = Yes)	0.00	0.02	-0.11	.909

Table 7

Likelihood Ratio Test between Intercept-Only Model and Categorical Predictor Models

	df	*AIC*	*BIC*	*logLik*	*deviance*	χ^2	*df*	*p*
Null Model	4	32,448	32,478	-16,220	32,440			
IEP	5	32,247	32,284	-16,119	32,237	202.70	1	< .001*
Child Race	10	31,944	32,018	-15,962	31,924	515.72	6	< .001*
Child Gender	5	32,387	32,424	-16,188	32,377	63.37	1	.211
Teacher Race	9	32444	32510	-16213	32426	14.301	5	.140
Teacher Gender	5	32450	32487	-16220	32440	0.0118	1	.914
Teacher Education	8	32447	32506	-16215	32431	9.2261	4	.056
Title 1	5	32366	32403	-16178	32356	84.081	1	< .001*
Percent Minorities	8	32286	32345	-16135	32270	170.42	4	< .001*
School Size	8	32451	32510	-16218	32435	4.7331	4	.316

Note. * = $p < .05$

Table 8

Hypothesis 2: Model with All Predictors Included

	B	*SE*	*t*	*p*
(Intercept)	0.04	0.03	1.42	.156
Job Satisfaction	0.00	0.01	0.74	.458
SES	0.03	0.01	4.60	.000*
Fall Scores	0.82	0.01	153.96	.000*
IEP Yes (ref = No)	-0.14	0.02	-8.69	.000*
2 or More Races (ref = White)	-0.01	0.02	-0.84	.403
American Indian (ref = White)	-0.08	0.05	-1.64	.102
Asian (ref = White)	0.03	0.03	1.05	.294
Black (ref = White)	-0.14	0.02	-8.30	.000*
Hispanic (ref = White)	-0.04	0.02	-2.16	.031
Pacific Islander (ref = White)	-0.08	0.06	-1.31	.192
Child Age	0.00	0.00	-0.59	.553
Child Female (ref = Male)	0.03	0.01	3.27	.200
Teacher Race 2 or more races (ref = White)	0.04	0.33	0.12	.906
Teacher Race Hispanic (ref = White)	0.04	0.04	0.94	.350
Teacher Race American Indian (ref = White)	0.12	0.07	1.76	.079
Teacher Race Asian (ref = White)	0.10	0.06	1.78	.075
Teacher Race Pacific Islander (ref = White)	-0.01	0.03	-0.22	.822
Teacher Age	0.00	0.00	0.66	.508
Teacher Male (ref = Female)	0.00	0.05	0.05	.957
Teacher Years of Experience	0.00	0.00	-1.24	.216
Teacher Edu. Bachelor's (ref = One year above Bachelor's)	0.03	0.02	1.37	.170
Teacher Edu. Master's(ref = One year above Bachelor's)	0.01	0.02	0.82	.412
Teacher Edu. Professional (ref = One year above Bachelor's)	0.04	0.03	1.38	.167
Teacher Edu. Doctorate (ref = One year above Bachelor's)	-0.02	0.08	-0.21	.837
School Size 0-149 (ref = 300-499)	-0.08	0.06	-1.43	.151
School Size 150-299 (ref = 300-499)	-0.04	0.03	-1.17	.242
School Size 500-749 (ref = 300-499)	0.00	0.02	0.02	.984
School Size Above 749 (ref = 300-499)	0.03	0.03	1.07	.283
Percent Minorities 10-25 (ref = Less than 10%)	0.00	0.03	-0.11	.913
Percent Minorities 25-50 (ref = Less than 10%)	0.03	0.03	0.97	.334
Percent Minorities 50-75 (ref = Less than 10%)	0.05	0.03	1.58	.114
Percent Minorities 75 or more (ref = Less than 10%)	-0.01	0.03	-0.17	.863
Title I Funding No (ref = Yes)	-0.01	0.02	-0.52	.600

Table 9

Hypothesis 2: Model with Interaction Term for Job Satisfaction and SES

	B	*SE*	*t*	*p*
(Intercept)	0.04	0.03	1.41	.158
Job Satisfaction	0.01	0.01	0.79	.429
SES	0.03	0.01	4.62	.000*
Fall Scores	0.82	0.01	153.84	.000*
IEP Yes (ref = No)	-0.14	0.02	-8.70	.000*
2 or More Races (ref = White)	-0.01	0.02	-0.83	.406
American Indian (ref = White)	-0.08	0.05	-1.63	.103
Asian (ref = White)	0.03	0.03	1.04	.297
Black (ref = White)	-0.14	0.02	-8.32	.000*
Hispanic (ref = White)	-0.04	0.02	-2.17	.030*
Pacific Islander (ref = White)	-0.08	0.06	-1.31	.191
Child Age	0.00	0.00	-0.58	.559
Child Female (ref = Male)	0.03	0.01	-3.26	.200
Teacher Race 2 or more races (ref = White)	0.04	0.33	0.11	.915
Teacher Race Hispanic (ref = White)	0.04	0.04	0.95	.344
Teacher Race American Indian (ref = White)	0.12	0.07	1.77	.077
Teacher Race Asian (ref = White)	0.10	0.06	1.79	.074
Teacher Race Pacific Islander (ref = White)	-0.01	0.03	-0.19	.848
Teacher Age	0.00	0.00	0.67	.506
Teacher Male (ref = Female)	0.00	0.05	0.08	.940
Teacher Years of Experience	0.00	0.00	-1.23	.217
Teacher Edu. Bachelor's (ref = One year above Bachelor's)	0.03	0.02	1.37	.170
Teacher Edu. Master's(ref = One year above Bachelor's)	0.01	0.02	0.82	.411
Teacher Edu. Professional (ref = One year above Bachelor's)	0.04	0.03	1.40	.163
Teacher Edu. Doctorate (ref = One year above Bachelor's)	-0.02	0.08	-0.20	.838
School Size 0-149 (ref = 300-499)	-0.08	0.06	-1.43	.152
School Size 150-299 (ref = 300-499)	-0.04	0.03	-1.17	.242
School Size 500-749 (ref = 300-499)	0.00	0.02	0.01	.991
School Size Above 749 (ref = 300-499)	0.03	0.03	1.08	.281
Percent Minorities 10-25 (ref = Less than 10%)	0.00	0.03	-0.11	.913
Percent Minorities 25-50 (ref = Less than 10%)	0.03	0.03	0.97	.331
Percent Minorities 50-75 (ref = Less than 10%)	0.05	0.03	1.57	.116
Percent Minorities 75 or more (ref = Less than 10%)	-0.01	0.03	-0.18	.857
Title I Funding No (ref = Yes)	-0.01	0.02	-0.53	.595
Job Satisfaction: SES	0.00	0.00	0.83	.409

Table 10

Hypothesis 3: Model with All Predictors Included

	B	*SE*	*t*	*p*
(Intercept)	0.04	0.03	1.52	.128
Job Satisfaction	0.01	0.01	0.80	.421
Professional Development	0.01	0.01	1.12	.264
Fall Scores	0.83	0.01	161.40	.000*
IEP Yes (ref = No)	-0.14	0.02	-8.84	.000*
2 or More Races (ref = White)	-0.02	0.02	-1.13	.260
American Indian (ref = White)	-0.08	0.05	-1.78	.075
Asian (ref = White)	0.03	0.03	1.13	.260
Black (ref = White)	-0.14	0.02	-8.73	.000*
Hispanic (ref = White)	-0.05	0.02	-2.54	.011*
Pacific Islander (ref = White)	-0.09	0.06	-1.38	.167
Child Age	0.00	0.00	-1.04	.300
Child Female (ref = Male)	0.03	0.01	3.16	.200
Teacher Race 2 or more races (ref = White)	0.01	0.33	0.03	.980
Teacher Race Hispanic (ref = White)	0.04	0.04	0.87	.387
Teacher Race American Indian (ref = White)	0.12	0.07	1.83	.067
Teacher Race Asian (ref = White)	0.11	0.06	1.82	.069
Teacher Race Pacific Islander (ref = White)	-0.01	0.03	-0.30	.767
Teacher Age	0.00	0.00	0.73	.464
Teacher Male (ref = Female)	0.01	0.05	0.12	.908
Teacher Years of Experience	0.00	0.00	-1.32	.187
Teacher Edu. Bachelor's (ref = One year above Bachelor's)	0.03	0.02	1.32	.188
Teacher Edu. Master's(ref = One year above Bachelor's)	0.01	0.02	0.84	.401
Teacher Edu. Professional (ref = One year above Bachelor's)	0.04	0.03	1.39	.164
Teacher Edu. Doctorate (ref = One year above Bachelor's)	-0.02	0.08	-0.19	.847
School Size 0-149 (ref = 300-499)	-0.09	0.06	-1.45	.148
School Size 150-299 (ref = 300-499)	-0.04	0.03	-1.26	.208
School Size 500-749 (ref = 300-499)	0.00	0.02	0.02	.981
School Size Above 749 (ref = 300-499)	0.03	0.03	0.99	.322
Percent Minorities 10-25 (ref = Less than 10%)	0.00	0.03	-0.12	.903
Percent Minorities 25-50 (ref = Less than 10%)	0.03	0.03	0.91	.362
Percent Minorities 50-75 (ref = Less than 10%)	0.05	0.03	1.35	.176
Percent Minorities 75 or more (ref = Less than 10%)	-0.01	0.03	-0.47	.636
Title I Funding No (ref = Yes)	0.00	0.02	-0.09	.932

Table 11

Hypothesis 3: Model with Interaction Term for Job Satisfaction and Professional Development

	B	*SE*	*t*	*p*
(Intercept)	0.04	0.03	1.53	.127
Job Satisfaction	0.01	0.01	0.86	.389
Professional Development	0.01	0.01	1.10	.270
Fall Scores	0.83	0.01	161.41	.000*
IEP Yes (ref = No)	-0.14	0.02	-8.83	.000*
2 or More Races (ref = White)	-0.02	0.02	-1.13	.259
American Indian (ref = White)	-0.08	0.05	-1.78	.075
Asian (ref = White)	0.03	0.03	1.12	.262
Black (ref = White)	-0.14	0.02	-8.73	.000*
Hispanic (ref = White)	-0.05	0.02	-2.53	.011*
Pacific Islander (ref = White)	-0.09	0.06	-1.38	.169
Child Age	0.00	0.00	-1.04	.300
Child Female (ref = Male)	0.03	0.01	3.16	.200
Teacher Race 2 or more races (ref = White)	0.01	0.32	0.02	.983
Teacher Race Hispanic (ref = White)	0.04	0.04	0.85	.393
Teacher Race American Indian (ref = White)	0.12	0.07	1.82	.069
Teacher Race Asian (ref = White)	0.11	0.06	1.82	.068
Teacher Race Pacific Islander (ref = White)	-0.01	0.03	-0.31	.760
Teacher Age	0.00	0.00	0.72	.470
Teacher Male (ref = Female)	0.01	0.05	0.12	.902
Teacher Years of Experience	0.00	0.00	-1.32	.188
Teacher Edu. Bachelor's (ref = One year above Bachelor's)	0.03	0.02	1.30	.195
Teacher Edu. Master's(ref = One year above Bachelor's)	0.01	0.02	0.84	.399
Teacher Edu. Professional (ref = One year above Bachelor's)	0.04	0.03	1.38	.166
Teacher Edu. Doctorate (ref = One year above Bachelor's)	-0.02	0.08	-0.20	.845
School Size 0-149 (ref = 300-499)	-0.09	0.06	-1.46	.146
School Size 150-299 (ref = 300-499)	-0.04	0.03	-1.26	.206
School Size 500-749 (ref = 300-499)	0.00	0.02	0.02	.982
School Size Above 749 (ref = 300-499)	0.03	0.03	0.99	.323
Percent Minorities 10-25 (ref = Less than 10%)	0.00	0.03	-0.11	.912
Percent Minorities 25-50 (ref = Less than 10%)	0.03	0.03	0.92	.356
Percent Minorities 50-75 (ref = Less than 10%)	0.05	0.03	1.35	.176
Percent Minorities 75 or more (ref = Less than 10%)	-0.01	0.03	-0.46	.645
Title I Funding No (ref = Yes)	0.00	0.02	-0.09	.926
Job Satisfaction: Professional Development	0.00	0.01	-0.45	.655

APPENDIX B

LIST OF FIGURES

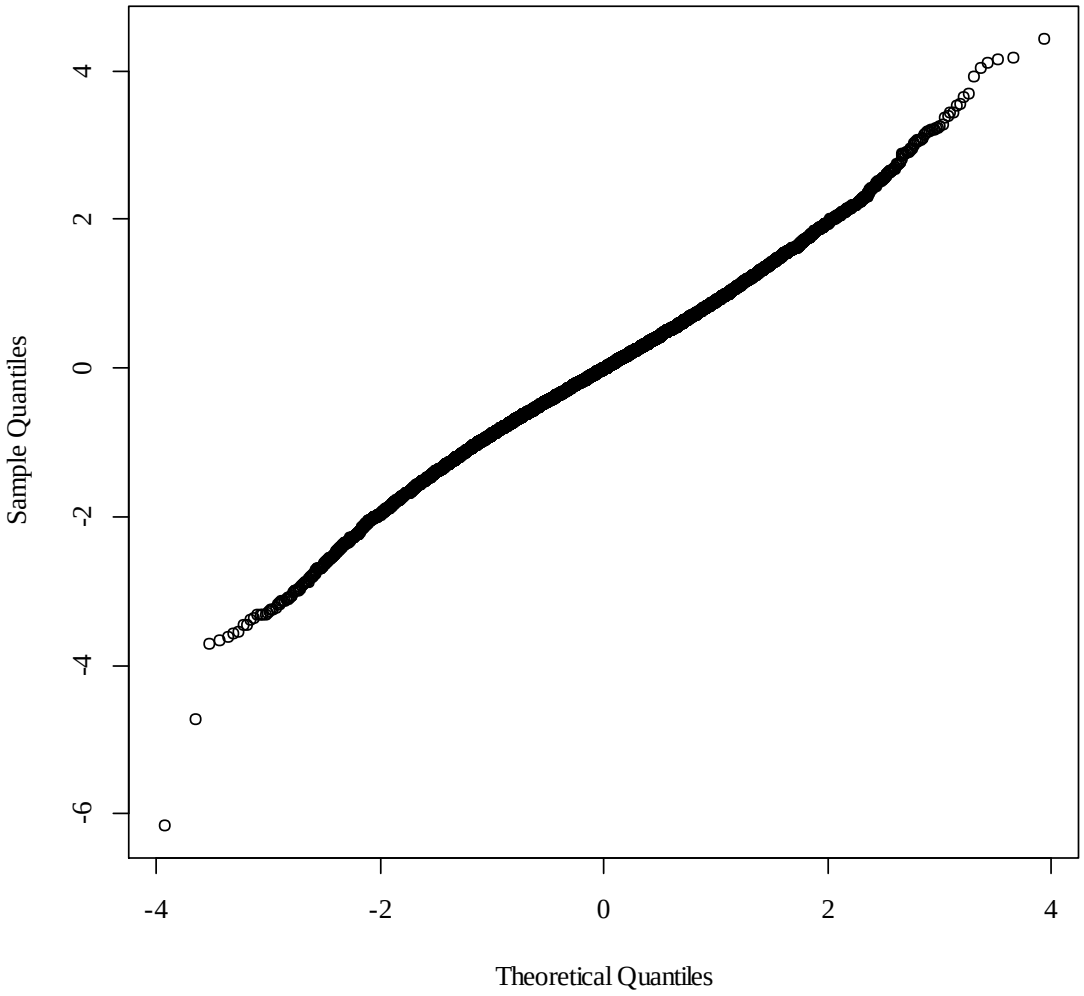

Figure 1. Normal Q-Q Plot of the Random Intercept Multilevel Model of Job Satisfaction Predicting Student Academic Achievement.

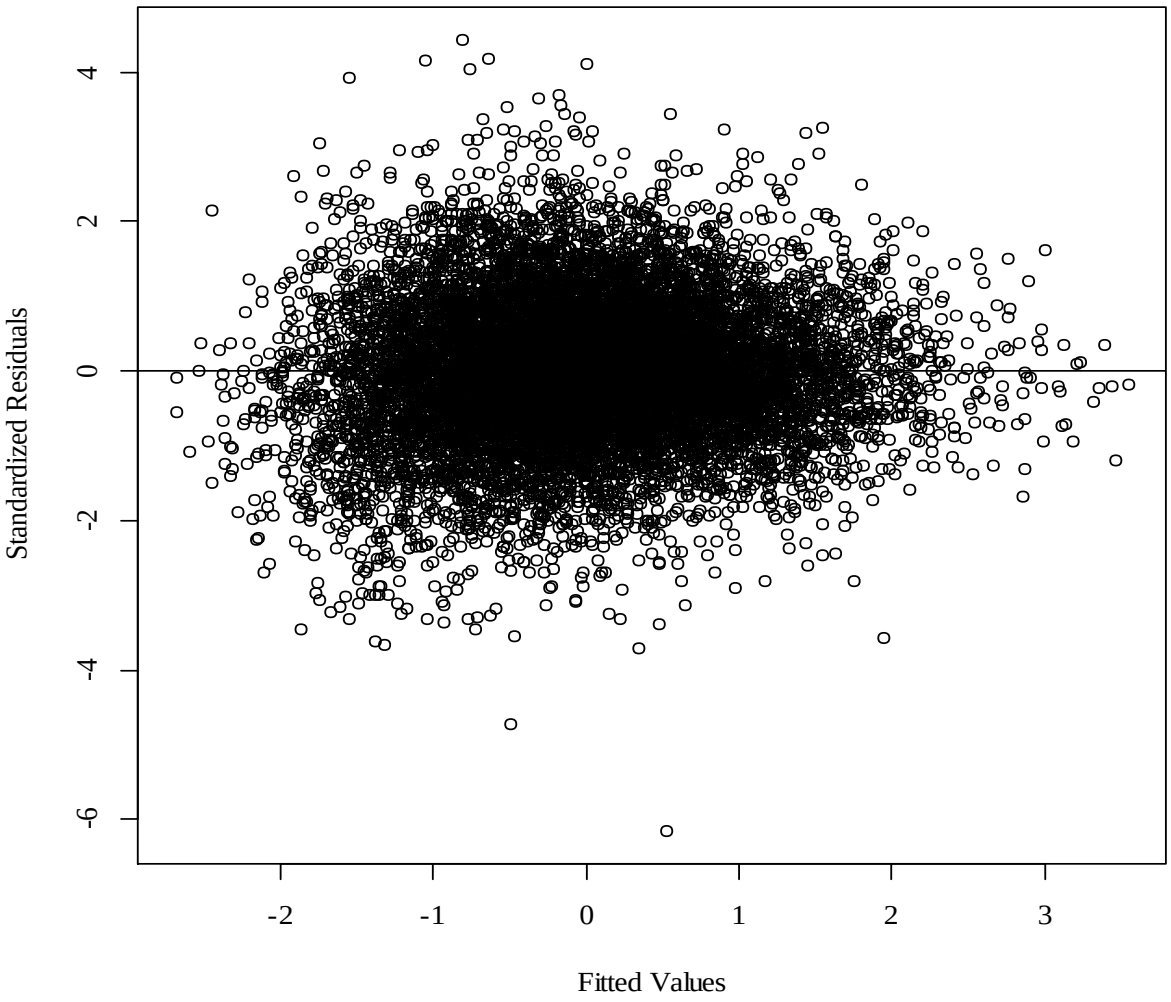

Figure 2. Residuals Scatterplot of the Random Intercept Multilevel Model of Job Satisfaction Predicting Student Academic Achievement.